IN THE CLAIMS

The following listing of the claims is provided in accordance with 37 C.F.R. 1.121.

1. (currently amended) An insulation condition monitoring method for a rotating electric machine, the method comprising:

measuring a first set of values for an instantaneous differential current and an instantaneous phase voltage during operation of the machine;

calculating a second set of values for a differential phasor current and a phasor voltage based upon the first set of values of the instantaneous differential current and the instantaneous phase voltage, respectively;

calculating an angular relationship between the differential phasor current and phasor voltage;

calculating a dissipation factor based on the angular relationship between the differential phasor current and phasor voltage; and

determining insulation condition based on the ~~angular relationship~~dissipation factor.

2. (canceled).

3. (currently amended) The method of claim [2]1, wherein the ~~at least one desired parameter~~ angular relationship includes a phase angle between the differential phasor current and the phasor voltage.

4. (currently amended) The method of claim [2]1, ~~wherein the at least one desired parameter includes an~~ further comprising determining insulation condition based on an AC insulation resistance value.

5. (canceled).

6. (currently amended) A method of operating an insulation condition monitoring system, the method comprising:

measuring a first set of values for an instantaneous differential current and an instantaneous phase voltage during operation of ~~the~~a rotating electric machine;

calculating a second set of values for a differential phasor current and a phasor voltage based upon the first set of values of the instantaneous differential current and the instantaneous phase voltage, respectively;

calculating an angular relationship between the differential phasor current and phasor voltage; and

calculating at least one desired parameter based on the angular relationship between the differential phasor current and the phasor voltage for determining insulation condition;

wherein at least one desired parameter includes a dissipation factor.

7. (original) The method of claim 6, wherein the values for the instantaneous differential current and the instantaneous phase voltage are measured via a differential current sensor and a voltage sensor respectively.

8. (original) The method of claim 6, wherein the at least one desired parameter includes a phase angle between the differential phasor current and the phasor voltage.

9. (original) The method of claim 6, wherein the at least one desired parameter includes an AC insulation resistance value.

10. (canceled).

11. (original) The method of claim 7, further comprising filtering and digitizing the output from the current sensor and the voltage sensor.

12. (currently amended) An insulation condition monitoring system for a rotating electric machine, the system comprising:

a differential current sensor coupled to the rotating electric machine for measuring values of instantaneous differential current;

a voltage sensor coupled to the rotating electric machine for measuring values of instantaneous phase voltage; and

a processing module coupled to the current sensor and the voltage sensor, the processing module being configured for converting the values for instantaneous differential current and instantaneous phase voltage to respective values for differential phasor current and phasor voltage, and wherein the processing module is further configured to calculate an angular relationship between the differential phasor current and phasor voltage, to calculate a dissipation factor based on the angular relationship between the differential phasor current and phasor voltage and ~~generating~~ to generate an output based on the ~~angular relationship~~ dissipation factor as an indication of insulation condition.

13. (original) The system of claim12, further comprising a data acquisition system for filtering and digitizing the output from the differential current sensor and the voltage sensor.

14. (original) The system of claim 12, further comprising a memory module for storing the output generated from the processing module.

15. (original) The system of claim 14, further comprising an indicator module coupled to the processing module via the memory module, the indicator module configured to indicate the insulation condition based on the output from the processing module.

16. (original) The system of claim 15, wherein the indicator module compares the output of the processing module to a predetermined threshold value.

17. (original) The system of claim 16, wherein the indicator module generates an alert when the output of the processing module exceeds the predetermined threshold value.

18. (currently amended) A rotating electric machine comprising:

stator and rotor windings configured to conduct electric current and generate magnetic field by virtue of flow of the current;

plurality of conductors to conduct electric current to the windings;

an insulation system for insulating the windings;

an insulation condition monitoring system including:

a differential current sensor coupled to the rotating electric machine for measuring values of instantaneous differential current of at least one winding;

a voltage sensor coupled to the rotating electric machine for measuring values of instantaneous phase voltage of the at least one winding; and

a processing module coupled to the current sensor and the voltage sensor, the processing module being configured to convert the values for instantaneous differential current and instantaneous phase voltage to respective values for <u>differential</u> phasor current and phasor voltage, and wherein the processing module is further configured to calculate an angular relationship between the <u>differential</u> phasor current and phasor voltage, <u>to calculate a dissipation factor based on the angular relationship between the</u>

differential phasor current and phasor voltage and ~~generating~~ to generate an output based on the ~~angular relationship~~ dissipation factor as an indication of insulation condition.

19. (original) The machine of claim 18, further comprising a data acquisition system for filtering and digitizing the output from the differential current sensor and the voltage sensor.

20. (original) The machine of claim 18, further comprising a memory module for storing the output generated from the processing module.

21. (original) The machine of claim 20, further comprising an indicator module coupled to the processing module via the memory module, the indicator module configured for indicating the insulation condition based on the output from the processing module.

22. (original) The machine of claim 18, wherein the machine comprises a single phase rotating machine.

23. (original) The machine of claim 18, wherein the machine comprises a three phase rotating machine.

24. (original) The machine of claim 18, wherein insulation condition is monitored for individual circuits per phase.

25. (original) The machine of claim 18, wherein insulation condition is monitored for each coil.

26. (original) The machine of claim 18, wherein insulation condition is monitored for the entire machine.

27. (original) The machine of claim 21, wherein the indicator module compares the output of the processing module to a predetermined threshold value.

28. (original) The machine of claim 27, wherein the indicator module generates an alert when the output of the processing module exceeds the threshold value.

29. (currently amended) An insulation condition monitoring system for a rotating electric machine, the system comprising:

means for measuring a first set of values for an instantaneous differential current and an instantaneous differential voltage;

means for calculating a second set of values for a differential phasor current and a phasor voltage based upon the first set of values of the instantaneous differential current and the instantaneous phase voltage, respectively;

means for calculating an angular relationship between the differential phasor current and phasor voltage;

means for calculating a dissipation factor based on the angular relationship between the differential phasor current and phasor voltage; and

means for determining insulation condition based on the ~~angular relationship~~dissipation factor.

30. (currently amended) A computer program for monitoring insulation condition of a rotating electric machine, the computer program comprising:

a routine for calculating a second set of values for a differential phasor current and a phasor voltage based upon a first set of values of an instantaneous differential current and an instantaneous phase voltage of the rotating machine, respectively;

a routine for calculating an angular relationship between the differential phasor current and phasor voltage;

a routine for calculating a dissipation factor based on the angular relationship between the differential phasor current and phasor voltage; and

a routine for determining insulation condition based on the ~~angular relationship~~dissipation factor.